Writing in the Mathematics Classroom with Chris and Pat Activities

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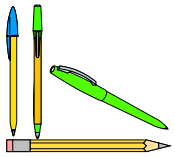
With much focus on writing across the curriculum, many teachers have chosen to incorporate journals into their non-language classrooms. This article discusses the importance of writing in mathematics classes and offers an alternative to journals. "Chris and Pat Writing Activities" are designed to help students better understand concepts by making decisions about who has used correct skills to solve a mathematical problem.

Writing in the Classroom Equals Journals

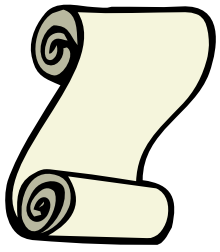
The phrase "writing across the curriculum" often brings to mind the word *journals.* When one reviews literature about incorporating writing in the classroom, journaling is the predominant strategy. This is for good reason since journals can be considered the all-purpose answer. They can be easily incorporated into any classroom (Ross, 1998).



Several variations of journals have evolved as teachers fit them into their individual classrooms. One teacher may use "response" journals while another uses "double-entry" journals. Response journals provide students with the opportunity to write their reactions to material. Double-entry journals, usually done on paper creased lengthwise, do the same but students are also asked to include notes from the class (Ross, 1998). Furthermore, journal writing can be used to explain processes, to create test questions and answers, or to use creative writing (Powell, 1997). The fact that there are many variations of journals supports the fact that teachers are adapting them into their classroom. The resounding point is that writing in non-language classrooms has definite benefits. Those benefits are discussed below followed by one teacher's strategy to incorporate writing into her mathematics classroom.

Writing in Mathematics is Important

The incorporation of writing into the non-language classrooms adds a new dimension for learning and assessment. Specifically in the mathematics classroom, reflection about the math concepts that students are learning leads students to crucial cognitive and affective insights. "By providing students with opportunities to work with mathematical ideas in their own terms, writing helps them to develop confidence in their understanding of mathematics and to become more thoroughly engaged with mathematics." While students practice communication mathematically, they gain appreciation of its importance and become better writers (Quinn, 1997).



Writing in the mathematics classroom gives students and teachers the chance to have dialogue between one another. Teachers provide precise feedback on each student's statements, interpretations, questions, discoveries, and misconceptions (Quinn, 1997). Additionally, teachers gain information about their instruction based on the students' responses. Teachers want their students to become active learners. It is inevitable that students will be actively involved in their learning as they think about how to respond to writing activities.

Chris and Pat Writing Activities

One teacher's means of incorporating writing into her mathematics classroom is through the use of Chris and Pat writing activities. Chris and Pat (gender neutral names) are two fictitious students who attempt

math problems. The teacher generates a handout that represents the work from Chris and Pat. On each problem, though, one of the fictitious students does something wrong. That error usually mirrors the common mistakes of the students. The student's task is to determine which one is correct and to explain their choice using complete sentences. See Figure 1.

Figure 1. Example of Chris and Pat Writing Activity

Chris and Pat Writing Activity
Dividing Mixed Numbers

Below are samples of Chris and Pat's work on some math problems. For each of the problems, only **one** student does it correctly. Examine their work to decide who has correctly solved the problem, and circle his or her name. Then on the lines provided, use complete sentences to EXPLAIN your choice.

Multiply. Answers should be written in simplest form.

$$3\frac{3}{8} \div 1\frac{1}{6}$$

Chris Pat

On this handout, Chris and Pat attempt to solve a problem involving dividing mixed numbers. Chris successfully finds the solution by converting mixed numbers to improper fractions, finding the reciprocal of the second fraction, and multiplying. Pat, unfortunately, commits an error that is common for many math students. He finds the improper fractions, but immediately multiplies without finding the reciprocal.

When the student is faced with deciding who is correct and who is incorrect, he or she must actively recall the process. Students who would have agreed with Pat have some cognitive dissonance when they have to determine what is wrong with Chris' attempt. It is the teacher's hope that this dissonance will cause the student to recall the correct process or to make the effort to look up the steps in his or her notes or textbook. Consequently, the active learning, not necessarily through hands-on activities but through thinking, allows the student to reconstruct knowledge.

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In the case that students agree with the fictitious student whose response was incorrect, the teacher knows immediately that those students need intervention whether it be through re-teaching, peer tutoring, or guided practice. The students who respond successfully to this activity reinforce their understanding by expressing their mathematical thinking in words. Also, all students who are given Chris and Pat writing activities practice double-checking math work, which is a skill useful for improving their own performance on assignments and

tests. See Figure 2.

Figure 2. Example of a Student's Response to Another Chris and Pat Writing Activity

Chris and Pat Writing Activity
Area of Circles

Below are samples of Chris and Pat's work on some math problems. For each of the problems, only **one** student does it correctly. Examine their work to decide who has correctly solved the problem, and circle his or her name. Then on the lines provided, use complete sentences to EXPLAIN your choice.

Find the area of each described figure.

1. a circle with a radius of 6 *m*

Chris Pat

Summary

Writing not only captures mathematical thinking but also facilitates learning in a powerful way (Quinn, 1997). Using Chris and Pat activities does more than give students a chance to respond. These activities ask students to understand why and to express that understanding in words. Thus, important math skills are better retained. Chris and Pat activities can be easily developed and adapted to many math concepts for most grade levels. Assessment of these activities gives students unique and immediate feedback. Writing activities can be included in non-language classrooms with little interference in teaching the subject curriculum. "Chris and Pat writing activities," an alternative to journaling, enhance the learning of math concepts while increasing the potential for student success through writing.

References

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